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CN

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Begin Translation:

CLAIMS

[Claim(s)]
[Claim 1] Cooling structure of the driving gear for ropeways characterized by providing or including the following. It is a block for wire ropes to the ends of the section to which for two points is transported, respectively. The cylinder-like drum made from the magnetic substance on the same shaft as the block for wire ropes of the driving side of ropeway equipment which transports the transfer object which stretched the endless wire rope among these blocks for wire ropes, was made to rotate one side of the aforementioned blocks for wire ropes in a driving source at least, and was held at the wire rope. The fin cooling structure make the drive drum which consisted of cylinder-like drums made from the aforementioned magnetic substance in the driving gear for ropeways which transmits the torque which sticks or screws a conductor on the peripheral face of this drum, prepares this conductor and a fixed interval, installs the circular linear motor which comes to constitute the iron core of a linear motor circularly, and is generated by this circular linear motor, the aforementioned drum, and the conductor to the block for wire ropes cool this drum.
[Claim 2] Cooling structure of the driving gear for ropeways according to claim 1 characterized by fixing and constituting the cooling fin of two or more tabulars toward the inside inside the cylinder-like drum made from the aforementioned magnetic substance in the aforementioned fin cooling structure.
[Claim 3] Cooling structure of the driving gear for ropeways according to claim 1 characterized by having fixed the cooling fin of two or more tabulars toward the inside inside the cylinder-like drum made from the aforementioned magnetic substance in the aforementioned fin cooling structure, having fixed the disc-like board to the shaft-orientations ends of the aforementioned cooling fin further, and constituting.
[Claim 4] Cooling structure of the driving gear for ropeways according to claim 1 characterized by fixing the pass partition plate which divides a cooling wind between the aforementioned cooling fins to the axis side of a cooling fin while fixing the cooling fin of two or more tabulars toward the inside inside the cylinder-like drum made from the aforementioned magnetic substance in the aforementioned fin cooling structure and fixing the disc-like board to the shaft-orientations ends of the aforementioned cooling fin further.
[Claim 5] The block for wire ropes is formed in the ends of the section to which for two points is transported, respectively. An endless wire rope is stretched among these blocks for wire ropes. One side of the aforementioned blocks for wire ropes is rotated in a driving source at least. The cylinder-like drum made from the magnetic substance is prepared on

the same shaft as the block for wire ropes of the driving side of ropeway equipment which transports the transfer object held at the wire rope. Stick or screw a conductor on the peripheral face of this drum, prepare this conductor and a fixed interval, and the circular linear motor which comes to constitute the iron core of a linear motor circularly is installed. In the driving gear for ropeways which transmits the torque generated by this circular linear motor, the aforementioned drum, and the conductor to the block for wire ropes The cylinder-like drum made from the aforementioned magnetic substance, and the plate made from the conductor, On the periphery of each boss section of the drive drum which consists of the boss who has on both sides of a rib and this rib Cooling structure of the driving gear for ropeways characterized by constituting so that cooling water may be poured in and discharged from both the aforementioned annulus rings to the cooling slot which attached the annulus ring attached in the fixed object, respectively, and was established in the inside of the aforementioned cylinder-like drum.

[Claim 6] Cooling structure of the driving gear for ropeways according to claim 5 characterized by constituting the cooling slot established in the inside of the aforementioned cylinder-like drum in the shape of a maze.

[Claim 7] Cooling structure of the driving gear for ropeways according to claim 5 characterized by constituting spirally the cooling slot established in the inside of the aforementioned cylinder-like drum.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the cooling structure of the driving gear for ropeways used in ropeway equipments, such as a lift and car gondola.

[0002]

[Description of the Prior Art] Ropeway equipments, such as a lift and car gondola, formed the block for wire ropes in the ends of the section to transport, stretched the endless wire rope between these blocks, and have formed further the block for a guide attached at the support for slack prevention of the object for point of inflection, or a wire rope in the middle of the transfer section. And it is equipment which is made to hold a lift, car gondola, etc. to this wire rope, attaches the driving gear for carrying out a rotation drive at least in one side of the block for wire ropes in the ends of the transfer section, and transports a lift, car gondola, etc.

[0003] An example of the driving gear for ropeways constituted by the linear motor currently used for drawing 18 and drawing 19 by conventional ropeway equipment is shown. Drawing 18 is a plan and drawing 19 is a side elevation.

[0004] The block 1 for wire ropes and the drive drum 10 are fixed on a shaft 3, and the shaft 3 is attached in the frame 2 possible [rotation] so that the block 1 for these wire ropes and the drive drum 10 may become level. The drive drum 10 connects the cylinder-like drum 10-1 which is made of the magnetic substance with the boss 10-4 in the said heart with a rib 10-3, it sticks or screws on and the plate 10-2 made from conductors, such as copper or aluminum, by the peripheral face of this cylinder-like drum 10-1 is constituted.

[0005] A wire rope 7 is the slot 1-1 established in the periphery of the block 1 for wire ropes as shown in a plan 20 and a perspective diagram 21. It is stretched. On the other hand, as shown in the perspective diagram of drawing 22, the magnetic-flux operating surface of an iron core 11-3 is constituted circularly, and the circular linear motor 11 which comes to attach in the attachment frame 11-1 what ****(ed) the coil 11-2 to this iron core

11-3 is opened and arranged in the periphery of the drive drum 10, and the predetermined opening G. In addition, the slot of coil ****** is omitted and the perspective diagram of drawing 22 is shown. Thus, the constituted driving gear for ropeways is being fixed to Foundation A.
[0006] ** -- **** [energization of the cylinder-like linear motor 11 / produce / turning effort / the shifting magnetic field which supplied the three-phase alternating current to the linear motor 11, and were generated / in composition / like / to the drive drum 10] -- making -- the block 1 for wire ropes -- 20rpm It rotates at the speed which is a grade. At this time, an eddy current occurs to the drive drum 10, and this serves as the Joule's heat and heats the drive drum 10. When not cooling at this time It goes up at 150 degrees C or more.
[0007]
[Problem(s) to be Solved by the Invention] The cooling system was not prepared in the drive drum of this conventional kind of driving gear for ropeways, but was only raising some cooling effect from the front face of a cylinder-like drum to it. Therefore, an injury will be invited to various portions by the excessive temperature rise. Although it changes also with loads, of course, it is this temperature rise at least. It is desirable to hold down to about 150 degrees C. Therefore, although a means to prepare a fan etc. outside and to perform a forced draft is also considered, the diameter of a drive drum is quite large, and in the fan of small capacity, an effect is thin and must install a mass fan. Although there is also the method of depending only on natural air cooling, without performing a forced draft, in that case, the diameter of a cylinder-like drum is enlarged still more sharply, the front face is increased, and the cooling effect must be raised.
[0008] this invention is the temperature of the drive drum of the driving gear for ropeways, without enlarging the diameter of a cylinder-like drum, without having been made in view of the above-mentioned point, and preparing a fan every exception. It aims at offering the cooling structure of the driving gear for ropeways which can be pressed down at about 150 degrees C or less.
[0009]
[Means for Solving the Problem] In order to attain the aforementioned purpose, the cooling structure of the ropeway driving gear by this invention The block for wire ropes is formed in the ends of the section to which for two points is transported, respectively. An endless wire rope is stretched among these blocks for wire ropes. One side of the aforementioned blocks for wire ropes is rotated in a driving source at least. The cylinder-like drum made from the magnetic substance is prepared on the same shaft as the block for wire ropes of the driving side of ropeway equipment which transports the transfer object held at the wire rope. Stick or screw a conductor on the peripheral face of this drum, prepare this conductor and a fixed interval, and the circular linear motor which comes to constitute the iron core of a linear motor circularly is installed. In the driving gear for ropeways which transmits the torque generated by this circular linear motor, the aforementioned drum, and the conductor to the block for wire ropes It is characterized by providing the fin cooling structure of making the drive drum which consisted of cylinder-like drums made from the aforementioned magnetic substance cooling this drum.
[0010] It is good also considering having fixed and constituted the cooling fin of two or more tabulars toward the inside inside the cylinder-like drum made from the aforementioned magnetic substance in the aforementioned fin cooling structure as a feature.
[0011] Moreover, it is good also considering having fixed the cooling fin of two or more tabulars toward the inside inside the cylinder-like drum made from the aforementioned magnetic substance in the aforementioned fin cooling structure, having fixed the disc-like board to the shaft-orientations ends of the aforementioned cooling fin further, and having

constituted as a feature.
[0012] Furthermore, while fixing the cooling fin of two or more tabulars toward the inside inside the cylinder-like drum made from the aforementioned magnetic substance in the aforementioned fin cooling structure and fixing a disc-like board to the shaft-orientations ends of the aforementioned cooling fin further, it is good also considering having fixed the pass partition plate which divides a cooling wind between the aforementioned cooling fins to the axis side of a cooling fin as a feature.
[0013] The cylinder-like drum made from the aforementioned magnetic substance by water cooling which uses cooling water when air cooling was inadequate, On the periphery of each boss section of the drive drum which consists of the plate made from the conductor, and the boss who has on both sides of a rib and this rib The annulus ring attached in the fixed object is attached, respectively, and it is characterized by constituting so that cooling water may be poured in and discharged from both the aforementioned annulus rings to the cooling slot established in the inside of the aforementioned cylinder-like drum.
[0014] It is good also considering having constituted the cooling slot established in the inside of the aforementioned cylinder-like drum in the shape of a maze as a feature.
[0015] Moreover, it is good also considering having constituted spirally the cooling slot established in the inside of the aforementioned cylinder-like drum as a feature.
[0016]
[Function] It supposes that an operation of the cooling structure of the driving gear for ropeways by this invention is combined with the example described below, and is explained, and explains in full detail based on a drawing according to a claim.
[0017]
[Example] Drawing 1 and drawing 2 are drawings showing one example of the cooling structure of the driving gear for ropeways of this invention about claims 1 and 2, drawing 1 is a plan, drawing 2 is A of drawing 1 - an A view cross section, and the same sign as drawing 18 -22 shows among drawing the same or the portion which has the same function. The cooling fins 4 which consist of wafer 4a of a tabular and 4b as shown in drawing 1 and drawing 2 are the both sides of a rib 10-3, and have fixed toward the inside of the cylinder-like drum 10-1.
[0018] In addition, although a cooling fin 4 consists of wafer of two sheets 4a of a tabular, and 4b and is being fixed inside toward the axis of the cylinder drum 10-1 in this example, it is not restricted to this, and you may incline and fix, without going to an axis, without dividing into a wafer. Like this example, it may not be mostly restricted to a rectangle and the configuration of a fin may also be a proper configuration.
[0019] Thus, in the drive drum which has the cooling structure by the constituted fin, if the circular linear motor 11 is energized, an eddy current will flow to the drive drum 10, the Joule's heat occurs, and the temperature of the drive drum 10 rises. On the other hand, it rotates, a cooling wind occurs with the centrifugal force of a cooling fin 4, and this drive drum cools a cooling fin 4. compared with the case where there is no cooling fin 4, it can be markedly alike in this way, and the temperature rise of the drive drum 10 can be held down very much to a degree not only according to the effect of the radiating-surface product which increased but according to this generated effect of the cooling style
[0020] Drawing 3 -5 are drawing showing one example of the cooling structure of the driving gear for ropeways of this invention about claims 1 and 3, and drawing 3 is [I of drawing 3 - an I view cross section, and drawing 5 of a plan and drawing 4] U of drawing 4 - a U view view. A different point from drawing 1 of this example shown in drawing 3 -5 and the example shown in 2 is a point which the board 5 in a circle has fixed to the ends of a cooling fin 4.
[0021] W of the cooling style enters from between this board 5 and shaft 3 in a circle, and it

blows outside along with an arrow, and the coil and the section of the circular linear motor 11 are also efficiently cooled at the same time it cools the drive drum 10. Thus, since it is emitted to the periphery of the drive drum 10, without a cooling wind distributing with the board 5 in a circle, the effect of thermolysis can be improved further.

[0022] Drawing 6 -8 are drawing showing one example of the cooling structure of the driving gear for ropeways of this invention about claims 1 and 4, and drawing 6 is [E of drawing 6 - an E view cross section, and drawing 8 of a plan and drawing 7] O of drawing 7 - an O view view. A different point from the example shown in drawing 3 -5 of this example shown in drawing 6 -8 is having fixed the pass partition plate which divides this cooling wind into the passage portion of the cooling style between cooling fins.

[0023] That is, the pass partition plate 6 is fixed among the cooling-fin wafers 4a and 4a shown in drawing 5 of a previous example in this example, and between 4b and 4b. After making this pass partition plate 6 incline as shown in drawing 7 , attaching it, dividing into w [of the cooling style], and w' all W of the cooling style absorbed to the drive drum 10 and applying strongly w of the cooling style by the side of a rib 10-3 to the cylinder-like drum 10-1, it is constituted so that remaining w[of the cooling style] ' may be joined and the coil and the section of the circular linear motor 11 may be reached. In this way, the cooling efficiency of the drive drum 10 can be improved further.

[0024] Drawing 9 -12 are drawing showing one example using the cooling water of the cooling structure of the driving gear for ropeways of this invention about claims 5 and 6, drawing 9 is an important section cross section [in / KI of drawing 9 - a KI line / a plan and drawing 10, and / in drawing 11], and drawing 12 is the development having developed and shown the slot of the cylinder-like drum of drawing 11 at the flat surface. / the mosquito of drawing 9 - a mosquito line cross section

[0025] Shell composition of the path of cooling water is carried out with drive drum 10' which consists of the boss 10-4 who has on both sides of 2 sets of annulus rings 10-5 attached in a fixed object (not shown) by the fixed metallic ornaments 13, the cylinder-like drum 10-1 and the plate 10-2 made from the conductor, a rib 10-3, and a rib, a seal ring 8, and 2 sets of communicating tubes 9. 2 sets of annulus rings 10-5 have a breakthrough d1 in the direction of a path, as shown in drawing 11, and they are attached in the periphery section of the both-sides boss 10-4 of a rib 10-3 through the seal ring 8. The breakthrough d1 prepared, respectively and the annular slot l open for free passage are formed in two annulus rings 10-5, and these slots l are maintained at a boss's 10-4 periphery by two seal rings 8 in the airtight, respectively. Inside the cylinder-like drum 10-1, two slot 10a, 10b and 10c, and 10 d are prepared at the both sides of a rib 10-3, respectively. While those slot 10a, 10b and 10c, and 10 d form sealing structure with the circle barrel lid 12, as shown in drawing 12, it is open for free passage in the shape of a maze between each slot, and it is slot 10b of the both sides of a rib 10-3. In order to make 10c open for free passage, the run through-hole d4 is formed in the rib 10-3. Slots 10a and 10d on the both ends The run through-hole d3 prepared for the boss 10-4, and d2 and the communicating tube 9 are airtightly open for free passage in the slot l established in the periphery of a boss's 10-4 both sides, respectively. A seal ring 8 maintains an airtight between the slot l established in the boss 10-4 who is body of revolution, and the breakthrough d1 prepared in the annulus ring 10-5 which is a fixed part, and it is prepared so that cooling water may not leak.

[0026] While was fixed and cooling water is poured in from the breakthrough d1 of an annulus ring 10-5. Pass maze-like slot 10a prepared in the cylinder-like drum 10-1 through the run through-hole d3, d2, and the communicating tube 9, 10b and 10c, and 10 d, and the cylinder-like drum 10-1 is cooled. It passes along the communicating tube 9 and the run through-hole d2 of another side, and d3, and is discharged from the breakthrough d1 of the annulus ring 10-5 to which another side was fixed. Thus, the Joule's heat generated in drive

drum 10' can be cooled powerfully.
[0027] In addition, although two slots were established in the cylinder drum 10-1 of the both sides of a rib 10-3 in this example, respectively, it is not limited to this and can consider as the proper number of slots.
[0028] Generally, the temperature rise of the drive drum 10 has ten to plate 2 most remarkable portion, and needs to make cooling of this portion a subject. However, establishing space in a plate 10-2, and circulating cooling water will increase the opening of a linear motor, and the fall of a thrust takes place. Then, in order to pour cooling water into the cylinder drum 10-1 which is sticking this portion continuously, an annulus ring 10-5 is fixed to an external case by the fixed metallic ornaments 13 shown in drawing 11, and a lot of cooling water is continuously supplied to ten to cylinder drum 1 portion through this annulus ring 10-5. When the path of cooling water was explained again in detail, for example cooling water is poured in from the breakthrough d1 of the annulus ring 10-5 on the left-hand side of a rib 10-3, Pass the slot l which exists directly under this breakthrough d1, the run through-holes d3 and d2, and the communicating tube 9. the free passage of slot 10a, 10b, and a rib 10-3 -- the heat of the drive drum 10-1 according [after passing along a hole d4 flow slot 10c and 10 d, and] to the Joule's heat -- absorbing -- the communicating tube 9 of another side, and a free passage -- pass holes d2 and d3 and Slot l -- it is discharged from the breakthrough d1 of the right-hand side annulus ring 10-5 In addition, sufficient consideration is paid to the leak of the entrance of the cooling water of an annulus ring 10-5, and an outlet, and sealing is carried out with packing etc. in this example.
[0029] Drawing 13 -17 are drawing showing one example using the cooling water of the cooling structure of the driving gear for ropeways of this invention about claims 5 and 7, a cross section [in / KE of drawing 13 - a KE line / drawing 13 and / in drawing 14], an important section cross section / in / KO of drawing 13 - a KO line], and drawing 16 are the block diagrams of the slot established in the cylinder-like drum, and drawing 17 is the development which developed the slot of the cylinder-like drum of drawing 15 at the flat surface In each of these drawings, the same sign as drawing 9 -12 shows the same or the portion which has the same function.
[0030] 2 sets of annulus rings 10-5 by which the path of cooling water is attached in a fixed object (not shown) by the fixed metallic ornaments 13, the cylinder-like drum 10-1, the plate 10-2 made from the conductor, and the drive drum 10 which consists of the boss 10-4 who has in this example on both sides of two ribs 10-3 (prepared in the both ends of the cylinder-like drum 10-1), and a rib -- " -- Shell composition is carried out with a seal ring 8 and 2 sets of communicating tubes 9. 2 sets of annulus rings 10-5 have a breakthrough d1 in the direction of a path, as shown in drawing 15, and they are arranged in the periphery section of the boss 10-4 of the outside of the rib 10-3 of both sides through the seal ring 8. The breakthrough d1 prepared, respectively and the annular slot l open for free passage are formed in two annulus rings 10-5, and these slots l are maintained at a boss's 10-4 periphery by two seal rings 8 in the airtight, respectively. Slot 10a -10g spiral to the inside of the cylinder-like drum 10-1 between ribs 10-3 It is prepared and is those slot 10a -10g. While forming sealing structure with the circle barrel lid 12 they are the both ends of a spiral slot at the rib 10-3 of both sides -- on the other hand, slot 10a 10g of and slots on another side in order to be open for free passage to the communicating tube 9, respectively -- a free passage -- the hole d4 is formed In order to make these communicating tubes 9 open for free passage to the annular slot l of a boss's 10-4 periphery, respectively, the run through-hole d3 and d2 are prepared for the boss 10-4. A seal ring 8 maintains an airtight between the slot l established in the boss 10-4 who is body of revolution, and the breakthrough d1 prepared in the annulus ring 10-5 which is a fixed part, and it is prepared so that cooling water may not leak.

[0031] While was fixed and cooling water is poured in from the breakthrough d1 of an annulus ring 10-5. a free passage -- spiral slot 10a -10g prepared in the cylinder-like drum 10-1 through a hole d3, d2, and the communicating tube 9 passing -- the cylinder-like drum 10-1 -- cooling -- the communicating tube 9 of another side, and a free passage -- it passes along a hole d2 and d3, and is discharged from the breakthrough d1 of the annulus ring 10-5 of another side Thus, the Joule's heat generated in drive drum 10" can be cooled powerfully.
[0032] Spiral slot 10a -10g After being spirally formed as shown in drawing 16, and forming a spiral thread groove in the inside of the cylinder drum 10-1, the circle barrel lid 12 which has the diameter of a periphery which contacts a part for this screw-thread Yamabe is made to attach, and it is considering as seal structure so that water may not leak outside. Although the spiral slot of the circumference of seven was established in the inside of the cylinder drum 10-1 inside two ribs 10-3 in this example, it is not limited to this and can consider as the proper number of revolution.
[0033] When the path of cooling water was explained again in detail, for example cooling water is poured in from the breakthrough d1 of the left-hand side annulus ring 10-5, Pass the slot l which exists directly under this breakthrough d1, the run through-holes d3 and d2, the communicating tube 9, and the run through-hole d4. spiral slot 10a -10g the heat of the drive drum 10-1 flow and according to the Joule's heat -- absorbing -- the free passage of another side -- a hole d4 and the communicating tube 9, and a free passage -- pass holes d2 and d3 and Slot l -- it is discharged from the breakthrough d1 of the right-hand side annulus ring 10-5 In addition, sufficient consideration for the leak of the entrance of the cooling water of an annulus ring 10-5 and an outlet is paid, and sealing is carried out with packing etc. in this example.
[0034]
[Effect of the Invention] As mentioned above, it is the temperature of a drive drum by applying various kinds of structures according to the capacity of a load according to this invention, as the example explained in detail. It becomes possible to stop within 150 degrees C. Although there is much what can attain this purpose easily without preparing the fan for forced drafts independently, especially when the generating Joule's heat is large, the purpose can be attained by cooling a drive drum with cooling water. Since it becomes unnecessary to enlarge a drum diameter extremely even though it takes which method, the cooling structure of the driving gear for ropeways by this invention has practically very high usefulness.

TECHNICAL FIELD

[Industrial Application] this invention relates to the cooling structure of the driving gear for ropeways used in ropeway equipments, such as a lift and car gondola.

PRIOR ART

[Description of the Prior Art] Ropeway equipments, such as a lift and car gondola, formed the block for wire ropes in the ends of the section to transport, stretched the endless wire rope between these blocks, and have formed further the block for a guide attached at the support for slack prevention of the object for point of inflection, or a wire rope in the middle of the transfer section. And it is equipment which is made to hold a lift, car gondola, etc. to this wire rope, attaches the driving gear for carrying out a rotation drive at least in

one side of the block for wire ropes in the ends of the transfer section, and transports a lift, car gondola, etc.
[0003] An example of the driving gear for ropeways constituted by the linear motor currently used for drawing 18 and drawing 19 by conventional ropeway equipment is shown. Drawing 18 is a plan and drawing 19 is a side elevation.
[0004] The block 1 for wire ropes and the drive drum 10 are fixed on a shaft 3, and the shaft 3 is attached in the frame 2 possible [rotation] so that the block 1 for these wire ropes and the drive drum 10 may become level. The drive drum 10 connects the cylinder-like drum 10-1 which is made of the magnetic substance with the boss 10-4 in the said heart with a rib 10-3, it sticks or screws on and the plate 10-2 made from conductors, such as copper or aluminum, by the peripheral face of this cylinder-like drum 10-1 is constituted.
[0005] A wire rope 7 is the slot 1-1 established in the periphery of the block 1 for wire ropes as shown in a plan 20 and a perspective diagram 21. It is stretched. On the other hand, as shown in the perspective diagram of drawing 22, the magnetic-flux operating surface of an iron core 11-3 is constituted circularly, and the circular linear motor 11 which comes to attach in the attachment frame 11-1 what ****(ed) the coil 11-2 to this iron core 11-3 is opened and arranged in the periphery of the drive drum 10, and the predetermined opening G. In addition, the slot of coil ****** is omitted and the perspective diagram of drawing 22 is shown. Thus, the constituted driving gear for ropeways is being fixed to Foundation A.
[0006] ** -- **** [energization of the cylinder-like linear motor 11 / produce / turning effort / the shifting magnetic field which supplied the three-phase alternating current to the linear motor 11, and were generated / in composition / like / to the drive drum 10] -- making -- the block 1 for wire ropes -- 20rpm It rotates at the speed which is a grade. At this time, an eddy current occurs to the drive drum 10, and this serves as the Joule's heat and heats the drive drum 10. When not cooling at this time It goes up at 150 degrees C or more.

EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, it is the temperature of a drive drum by applying various kinds of structures according to the capacity of a load according to this invention, as the example explained in detail. It becomes possible to stop within 150 degrees C. Although there is much what can attain this purpose easily without preparing the fan for forced drafts independently, especially when the generating Joule's heat is large, the purpose can be attained by cooling a drive drum with cooling water. Since it becomes unnecessary to enlarge a drum diameter extremely even though it takes which method, the cooling structure of the driving gear for ropeways by this invention has practically very high usefulness.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] The cooling system was not prepared in the drive drum of this conventional kind of driving gear for ropeways, but was only raising some cooling effect from the front face of a cylinder-like drum to it. Therefore, damage will be invited to various portions by the excessive temperature rise. Although it changes also with loads, of course, it is this temperature rise at least. It is desirable to hold down to about 150 degrees C. Therefore, although a means to prepare a fan etc. outside and to

perform a forced draft is also considered, the diameter of a drive drum is quite large, and in the fan of small capacity, an effect is thin and must install a mass fan. Although there is also the method of depending only on natural air cooling, without performing a forced draft, in that case, the diameter of a cylinder-like drum is enlarged still more sharply, the front face is increased, and the cooling effect must be raised.

[0008] this invention is the temperature of the drive drum of the driving gear for ropeways, without enlarging the diameter of a cylinder-like drum, without having been made in view of the above-mentioned point, and preparing a fan every exception. It aims at offering the cooling structure of the driving gear for ropeways which can be pressed down at about 150 degrees C or less.

MEANS

[Means for Solving the Problem] In order to attain the aforementioned purpose, the cooling structure of the ropeway driving gear by this invention The block for wire ropes is formed in the ends of the section to which for two points is transported, respectively. An endless wire rope is stretched among these blocks for wire ropes. One side of the aforementioned blocks for wire ropes is rotated in a driving source at least. The cylinder-like drum made from the magnetic substance is prepared on the same shaft as the block for wire ropes of the driving side of ropeway equipment which transports the transfer object held at the wire rope. Stick or screw a conductor on the peripheral face of this drum, prepare this conductor and a fixed interval, and the circular linear motor which comes to constitute the iron core of a linear motor circularly is installed. In the driving gear for ropeways which transmits the torque generated by this circular linear motor, the aforementioned drum, and the conductor to the block for wire ropes It is characterized by providing the fin cooling structure of making the drive drum which consisted of cylinder-like drums made from the aforementioned magnetic substance cooling this drum.

[0010] It is good also considering having fixed and constituted the cooling fin of two or more tabulars toward the inside inside the cylinder-like drum made from the aforementioned magnetic substance in the aforementioned fin cooling structure as a feature.

[0011] Moreover, it is good also considering having fixed the cooling fin of two or more tabulars toward the inside inside the cylinder-like drum made from the aforementioned magnetic substance in the aforementioned fin cooling structure, having fixed the disc-like board to the shaft-orientations ends of the aforementioned cooling fin further, and having constituted as a feature.

[0012] Furthermore, while fixing the cooling fin of two or more tabulars toward the inside inside the cylinder-like drum made from the aforementioned magnetic substance in the aforementioned fin cooling structure and fixing a disc-like board to the shaft-orientations ends of the aforementioned cooling fin further, it is good also considering having fixed the pass partition plate which divides a cooling wind between the aforementioned cooling fins to the axis side of a cooling fin as a feature.

[0013] The cylinder-like drum made from the aforementioned magnetic substance by water cooling which uses cooling water when air cooling was inadequate, On the periphery of each boss section of the drive drum which consists of the plate made from the conductor, and the boss who has on both sides of a rib and this rib The annulus ring attached in the fixed object is attached, respectively, and it is characterized by constituting so that cooling water may be poured in and discharged from both the aforementioned annulus rings to the cooling slot established in the inside of the aforementioned cylinder-like drum.

[0014] It is good also considering having constituted the cooling slot established in the

inside of the aforementioned cylinder-like drum in the shape of a maze as a feature.
[0015] Moreover, it is good also considering having constituted spirally the cooling slot established in the inside of the aforementioned cylinder-like drum as a feature.

OPERATION

[Function] It supposes that an operation of the cooling structure of the driving gear for ropeways by this invention is combined with the example described below, and is explained, and explains in full detail based on a drawing according to a claim.

EXAMPLE

[Example] Drawing 1 and drawing 2 are drawings showing one example of the cooling structure of the driving gear for ropeways of this invention about claims 1 and 2, drawing 1 is a plan, drawing 2 is A of drawing 1 - an A view cross section, and the same sign as drawing 18 -22 shows among drawing the same or the portion which has the same function. The cooling fins 4 which consist of wafer 4a of a tabular and 4b as shown in drawing 1 and drawing 2 are the both sides of a rib 10-3, and have fixed toward the inside of the cylinder-like drum 10-1.
[0018] In addition, although a cooling fin 4 consists of wafer of two sheets 4a of a tabular, and 4b and is being fixed inside toward the axis of the cylinder drum 10-1 in this example, it is not restricted to this, and you may incline and fix, without going to an axis, without dividing into a wafer. Like this example, it may not be mostly restricted to a rectangle and the configuration of a fin may also be a proper configuration.
[0019] Thus, in the drive drum which has the cooling structure by the constituted fin, if the circular linear motor 11 is energized, an eddy current will flow to the drive drum 10, the Joule's heat occurs, and the temperature of the drive drum 10 rises. On the other hand, it rotates, a cooling wind occurs with the centrifugal force of a cooling fin 4, and this drive drum cools a cooling fin 4. compared with the case where there is no cooling fin 4, it can be markedly alike in this way, and the temperature rise of the drive drum 10 can be held down very much to a degree not only according to the effect of the radiating-surface product which increased but according to this generated effect of the cooling style
[0020] Drawing 3 -5 are drawing showing one example of the cooling structure of the driving gear for ropeways of this invention about claims 1 and 3, and drawing 3 is [I of drawing 3 - an I view cross section, and drawing 5 of a plan and drawing 4] U of drawing 4 - a U view view. A different point from drawing 1 of this example shown in drawing 3 -5 and the example shown in 2 is a point which the board 5 in a circle has fixed to the ends of a cooling fin 4.
[0021] W of the cooling style enters from between this board 5 and shaft 3 in a circle, and it blows outside along with an arrow, and the coil and the section of the circular linear motor 11 are also efficiently cooled at the same time it cools the drive drum 10. Thus, since it is emitted to the periphery of the drive drum 10, without a cooling wind distributing with the board 5 in a circle, the effect of thermolysis can be improved further.
[0022] Drawing 6 -8 are drawing showing one example of the cooling structure of the driving gear for ropeways of this invention about claims 1 and 4, and drawing 6 is [E of drawing 6 - an E view cross section, and drawing 8 of a plan and drawing 7] O of drawing 7 - an O view view. A different point from the example shown in drawing 3 -5 of this

example shown in drawing 6 -8 is having fixed the pass partition plate which divides this cooling wind into the passage portion of the cooling style between cooling fins.
[0023] That is, the pass partition plate 6 is fixed among the cooling-fin wafers 4a and 4a shown in drawing 5 of a previous example in this example, and between 4b and 4b. After making this pass partition plate 6 incline as shown in drawing 7 , attaching it, dividing into w [of the cooling style], and w' all W of the cooling style absorbed to the drive drum 10 and applying strongly w of the cooling style by the side of a rib 10-3 to the cylinder-like drum 10-1, it is constituted so that remaining w[of the cooling style] ' may be joined and the coil and the section of the circular linear motor 11 may be reached. In this way, the cooling efficiency of the drive drum 10 can be improved further.
[0024] Drawing 9 -12 are drawing showing one example using the cooling water of the cooling structure of the driving gear for ropeways of this invention about claims 5 and 6, drawing 9 is an important section cross section [in / KI of drawing 9 - a KI line / a plan and drawing 10, and / in drawing 11], and drawing 12 is the development having developed and shown the slot of the cylinder-like drum of drawing 11 at the flat surface. / the mosquito of drawing 9 - a mosquito line cross section
[0025] Shell composition of the path of cooling water is carried out with drive drum 10' which consists of the boss 10-4 who has on both sides of 2 sets of annulus rings 10-5 attached in a fixed object (not shown) by the fixed metallic ornaments 13, the cylinder-like drum 10-1 and the plate 10-2 made from the conductor, a rib 10-3, and a rib, a seal ring 8, and 2 sets of communicating tubes 9. 2 sets of annulus rings 10-5 have a breakthrough d1 in the direction of a path, as shown in drawing 11, and they are attached in the periphery section of the both-sides boss 10-4 of a rib 10-3 through the seal ring 8. The breakthrough d1 prepared, respectively and the annular slot l open for free passage are formed in two annulus rings 10-5, and these slots l are maintained at a boss's 10-4 periphery by two seal rings 8 in the airtight, respectively. Inside the cylinder-like drum 10-1, two slot 10a, 10b and 10c, and 10 d are prepared at the both sides of a rib 10-3, respectively. While those slot 10a, 10b and 10c, and 10 d form sealing structure with the circle barrel lid 12, as shown in drawing 12, it is open for free passage in the shape of a maze between each slot, and it is slot 10b of the both sides of a rib 10-3. In order to make 10c open for free passage, the run through-hole d4 is formed in the rib 10-3. Slots 10a and 10d on the both ends The run through-hole d3 prepared for the boss 10-4, and d2 and the communicating tube 9 are airtightly open for free passage in the slot l established in the periphery of a boss's 10-4 both sides, respectively. A seal ring 8 maintains an airtight between the slot l established in the boss 10-4 who is body of revolution, and the breakthrough d1 prepared in the annulus ring 10-5 which is a fixed part, and it is prepared so that cooling water may not leak.
[0026] While was fixed and cooling water is poured in from the breakthrough d1 of an annulus ring 10-5. Pass maze-like slot 10a prepared in the cylinder-like drum 10-1 through the run through-hole d3, d2, and the communicating tube 9, 10b and 10c, and 10 d, and the cylinder-like drum 10-1 is cooled. It passes along the communicating tube 9 and the run through-hole d2 of another side, and d3, and is discharged from the breakthrough d1 of the annulus ring 10-5 to which another side was fixed. Thus, the Joule's heat generated in drive drum 10' can be cooled powerfully.
[0027] In addition, although two slots were established in the cylinder drum 10-1 of the both sides of a rib 10-3 in this example, respectively, it is not limited to this and can consider as the proper number of slots.
[0028] Generally, the temperature rise of the drive drum 10 has ten to plate 2 most remarkable portion, and needs to make cooling of this portion a subject. However, establishing space in a plate 10-2, and circulating cooling water will increase the opening of a linear motor, and the fall of a thrust takes place. Then, in order to pour cooling water into

the cylinder drum 10-1 which is sticking this portion continuously, an annulus ring 10-5 is fixed to an external case by the fixed metallic ornaments 13 shown in drawing 11, and a lot of cooling water is continuously supplied to ten to cylinder drum 1 portion through this annulus ring 10-5. When the path of cooling water was explained again in detail, for example cooling water is poured in from the breakthrough d1 of the annulus ring 10-5 on the left-hand side of a rib 10-3, Pass the slot l which exists directly under this breakthrough d1, the run through-holes d3 and d2, and the communicating tube 9. the free passage of slot 10a, 10b, and a rib 10-3 -- the heat of the drive drum 10-1 according [after passing along a hole d4 flow slot 10c and 10 d, and] to the Joule's heat -- absorbing -- the communicating tube 9 of another side, and a free passage -- pass holes d2 and d3 and Slot l -- it is discharged from the breakthrough d1 of the right-hand side annulus ring 10-5 In addition, sufficient consideration is paid to the leak of the entrance of the cooling water of an annulus ring 10-5, and an outlet, and sealing is carried out with packing etc. in this example.

[0029] Drawing 13 -17 are drawing showing one example using the cooling water of the cooling structure of the driving gear for ropeways of this invention about claims 5 and 7, a cross section [in / KE of drawing 13 - a KE line / drawing 13 and / in drawing 14], an important section cross section / in / KO of drawing 13 - a KO line], and drawing 16 are the block diagrams of the slot established in the cylinder-like drum, and drawing 17 is the development which developed the slot of the cylinder-like drum of drawing 15 at the flat surface In each of these drawings, the same sign as drawing 9 -12 shows the same or the portion which has the same function.

[0030] 2 sets of annulus rings 10-5 by which the path of cooling water is attached in a fixed object (not shown) by the fixed metallic ornaments 13, the cylinder-like drum 10-1, the plate 10-2 made from the conductor, and the drive drum 10 which consists of the boss 10-4 who has in this example on both sides of two ribs 10-3 (prepared in the both ends of the cylinder-like drum 10-1), and a rib -- " -- Shell composition is carried out with a seal ring 8 and 2 sets of communicating tubes 9. 2 sets of annulus rings 10-5 have a breakthrough d1 in the direction of a path, as shown in drawing 15, and they are arranged in the periphery section of the boss 10-4 of the outside of the rib 10-3 of both sides through the seal ring 8. The breakthrough d1 prepared, respectively and the annular slot l open for free passage are formed in two annulus rings 10-5, and these slots l are maintained at a boss's 10-4 periphery by two seal rings 8 in the airtight, respectively. Slot 10a -10g spiral to the inside of the cylinder-like drum 10-1 between ribs 10-3 It is prepared and is those slot 10a -10g. While forming sealing structure with the circle barrel lid 12 they are the both ends of a spiral slot at the rib 10-3 of both sides -- on the other hand, slot 10a 10g of and slots on another side in order to be open for free passage to the communicating tube 9, respectively -- a free passage -- the hole d4 is formed In order to make these communicating tubes 9 open for free passage to the annular slot l of a boss's 10-4 periphery, respectively, the run through-hole d3 and d2 are prepared for the boss 10-4. A seal ring 8 maintains an airtight between the slot l established in the boss 10-4 who is body of revolution, and the breakthrough d1 prepared in the annulus ring 10-5 which is a fixed part, and it is prepared so that cooling water may not leak.

[0031] While was fixed and cooling water is poured in from the breakthrough d1 of an annulus ring 10-5. a free passage -- spiral slot 10a -10g prepared in the cylinder-like drum 10-1 through a hole d3, d2, and the communicating tube 9 passing -- the cylinder-like drum 10-1 -- cooling -- the communicating tube 9 of another side, and a free passage -- it passes along a hole d2 and d3, and is discharged from the breakthrough d1 of the annulus ring 10-5 of another side Thus, the Joule's heat generated in drive drum 10" can be cooled powerfully.

[0032] Spiral slot 10a -10g After being spirally formed as shown in drawing 16, and

forming a spiral thread groove in the inside of the cylinder drum 10-1, the circle barrel lid 12 which has the diameter of a periphery which contacts a part for this screw-thread Yamabe is made to attach, and it is considering as seal structure so that water may not leak outside. Although the spiral slot of the circumference of seven was established in the inside of the cylinder drum 10-1 inside two ribs 10-3 in this example, it is not limited to this and can consider as the proper number of revolution.

[0033] When the path of cooling water was explained again in detail, for example cooling water is poured in from the breakthrough d1 of the left-hand side annulus ring 10-5, Pass the slot l which exists directly under this breakthrough d1, the run through-holes d3 and d2, the communicating tube 9, and the run through-hole d4. spiral slot 10a -10g the heat of the drive drum 10-1 flow and according to the Joule's heat -- absorbing -- the free passage of another side -- a hole d4 and the communicating tube 9, and a free passage -- pass holes d2 and d3 and Slot l -- it is discharged from the breakthrough d1 of the right-hand side annulus ring 10-5 In addition, sufficient consideration for the leak of the entrance of the cooling water of an annulus ring 10-5 and an outlet is paid, and sealing is carried out with packing etc. in this example.

[0034]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the plan showing one example of the cooling structure of the driving gear for ropeways of this invention about claims 1 and 2.

[Drawing 2] They are A of drawing 1 - an A view cross section.

[Drawing 3] It is the plan showing one example of the cooling structure of the driving gear for ropeways of this invention about claims 1 and 3.

[Drawing 4] They are I of drawing 3 - an I view cross section.

[Drawing 5] They are U of drawing 4 - a U view view.

[Drawing 6] It is the plan showing one example of the cooling structure of the driving gear for ropeways of this invention about claims 1 and 4.

[Drawing 7] They are E of drawing 6 - an E view cross section.

[Drawing 8] They are O of drawing 7 - an O view view.

[Drawing 9] It is the plan showing one example using the cooling water of the cooling structure of the driving gear for ropeways of this invention about claims 5 and 6.

[Drawing 10] They are the mosquito of drawing 9 - a mosquito line cross section.

[Drawing 11] It is an important section cross section in KI of drawing 9 - a KI line.

[Drawing 12] It is the development having developed and shown the slot of the cylinder-like drum of drawing 11 at the flat surface.

[Drawing 13] It is the plan showing one example using the cooling water of the cooling structure of the driving gear for ropeways of this invention about claims 5 and 7.

[Drawing 14] It is a cross section in KO of drawing 13 - a KO line.

[Drawing 15] It is an important section cross section in KE of drawing 13 - a KE line.

[Drawing 16] It is the block diagram of the slot established in the cylinder-like drum.

[Drawing 17] It is the development which developed the slot of the cylinder-like drum of drawing 15 at the flat surface.

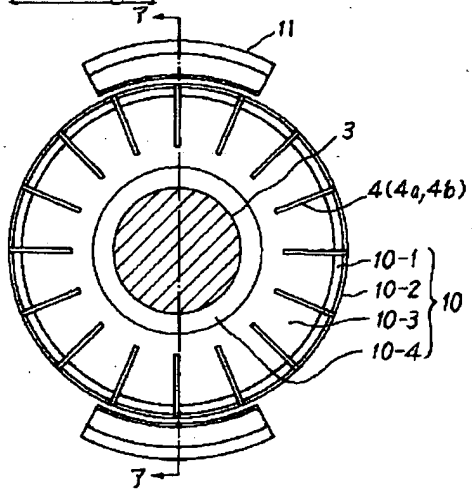
[Drawing 18] It is the plan showing an example of the driving gear for ropeways constituted by the linear motor currently used for conventional ropeway equipment.

[Drawing 19] It is the side elevation showing an example of the driving gear for ropeways constituted by the linear motor currently used for conventional ropeway equipment.

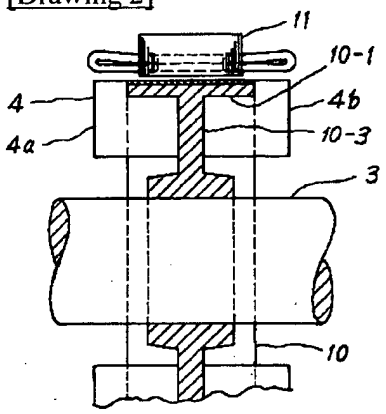
[Drawing 20] It is the plan showing the set-up situation of a wire rope.
[Drawing 21] It is the perspective diagram showing the set-up situation of a wire rope.
[Drawing 22] It is the perspective diagram of the circular linear motor of the kind used for this invention.
[Description of Notations]
1 Block for Wire Ropes
1-1 Slot Established in Periphery
2 Frame
3 Shaft
4 Cooling Fin
4a, 4b Wafer of a cooling fin
5 Board in a Circle
6 Pass Partition Plate
7 Wire Rope
8 Seal Ring
9 Communicating Tube
10, 10', 10" Drive drum
10-1 Cylinder-like Drum Which is Made of Magnetic Substance
10-2 Plate Made from Conductors, Such as Copper or Aluminum
10-3 Rib
10-4 Boss
10-5 Annulus Ring
10a -10g Slot established in the inside of a cylinder-like drum
11 Circular Linear Motor
11-1 Attachment Frame
11-2 Coil
11-3 Iron Core
12 Circle Barrel Lid
13 Fixed Metallic Ornaments
A Foundation
G Opening
d1 Breakthrough
d2, d3, d4 Run through-hole
l The slot of a boss periphery
W Cooling wind
w, the cooling wind of which w' division was done

DRAWINGS

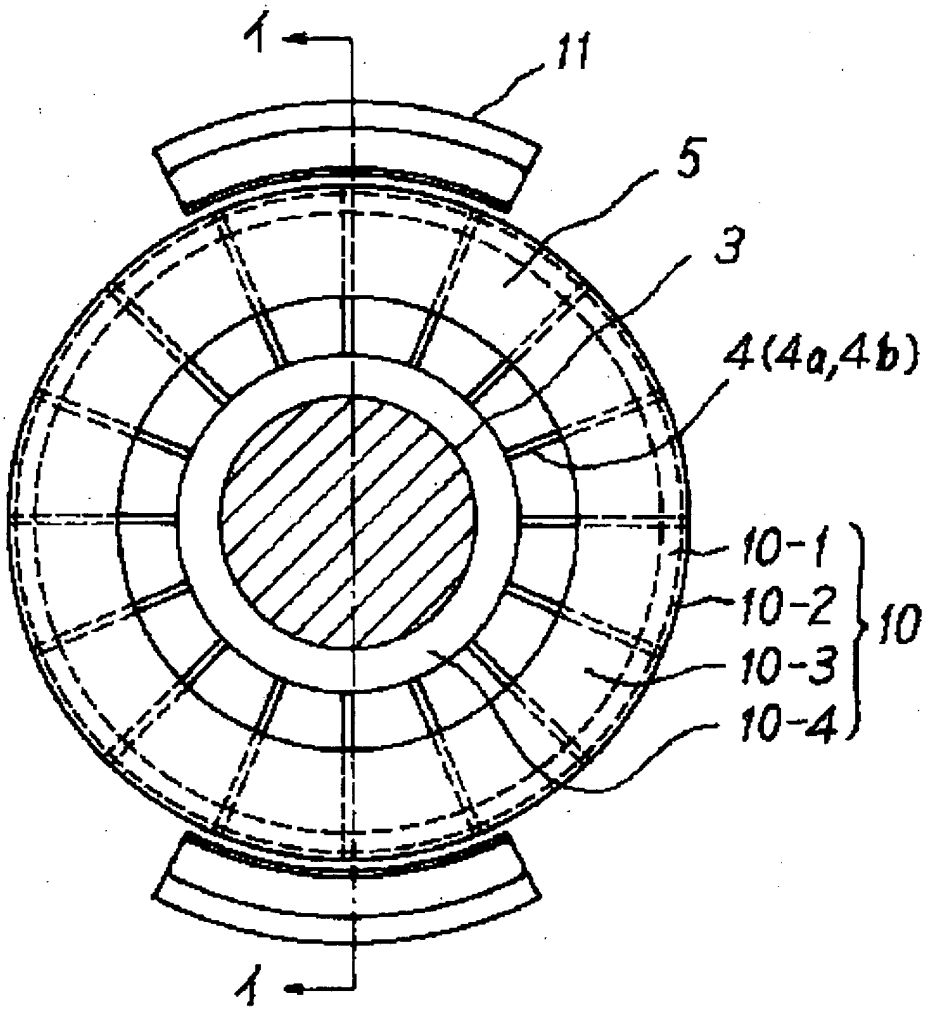
[Drawing 1]



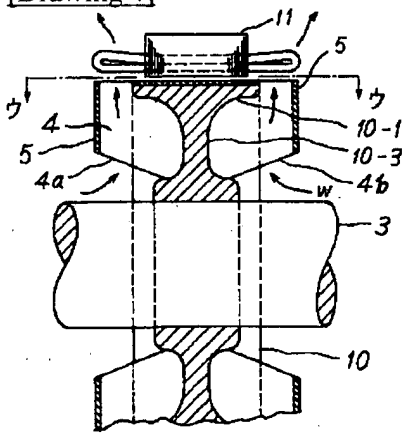
[Drawing 2]



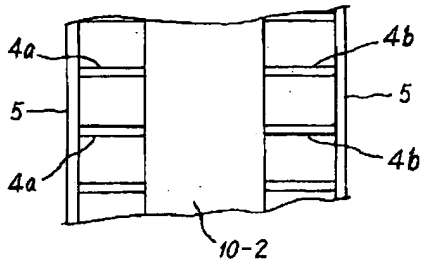
[Drawing 3]



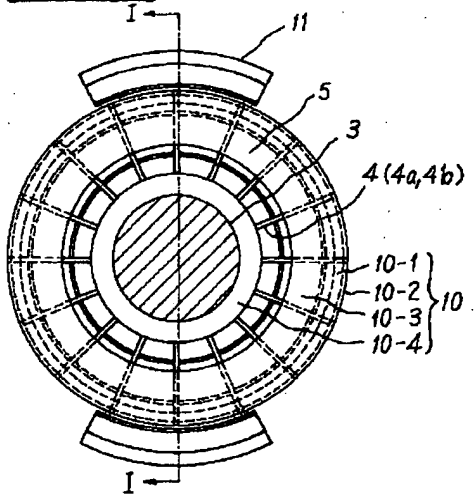
[Drawing 4]



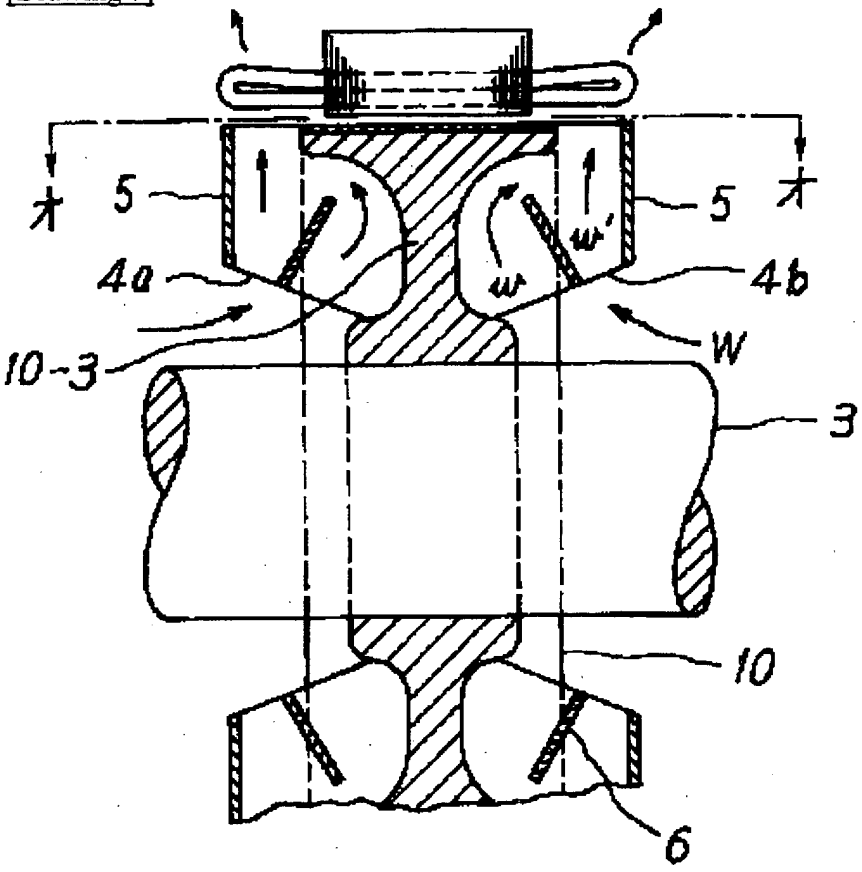
[Drawing 5]



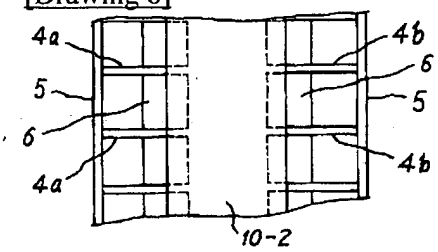
[Drawing 6]



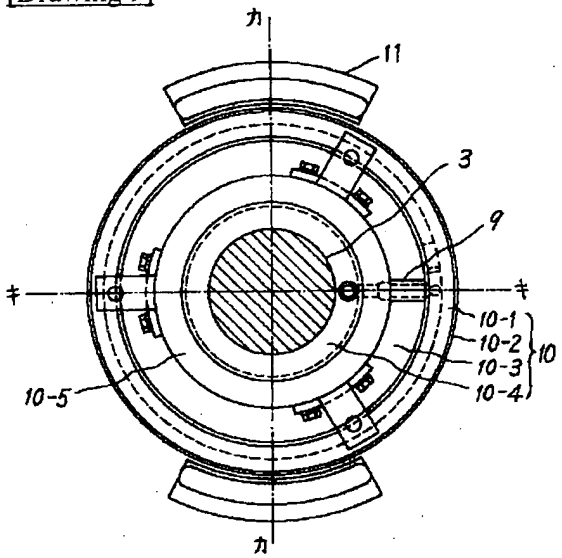
[Drawing 7]



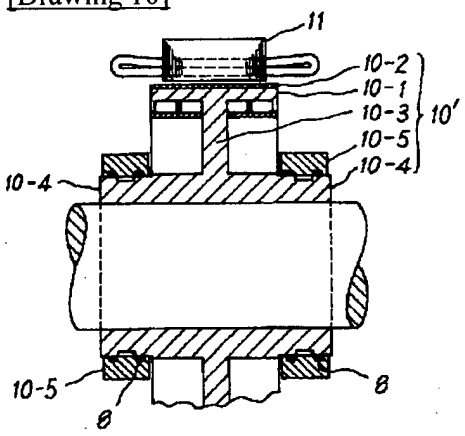
[Drawing 8]



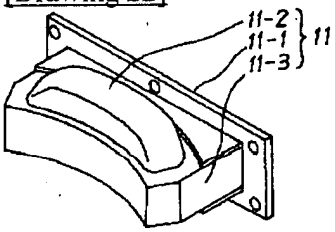
[Drawing 9]



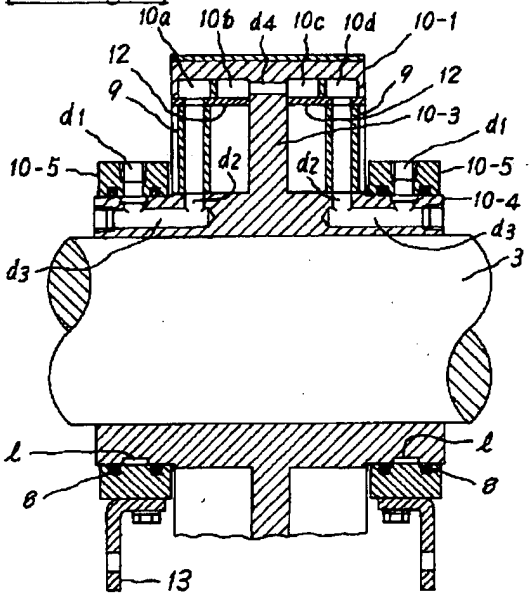
[Drawing 10]



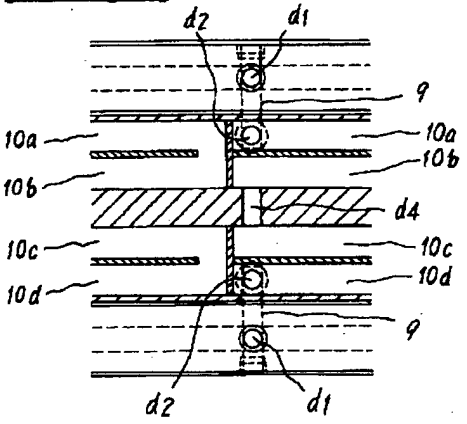
[Drawing 22]



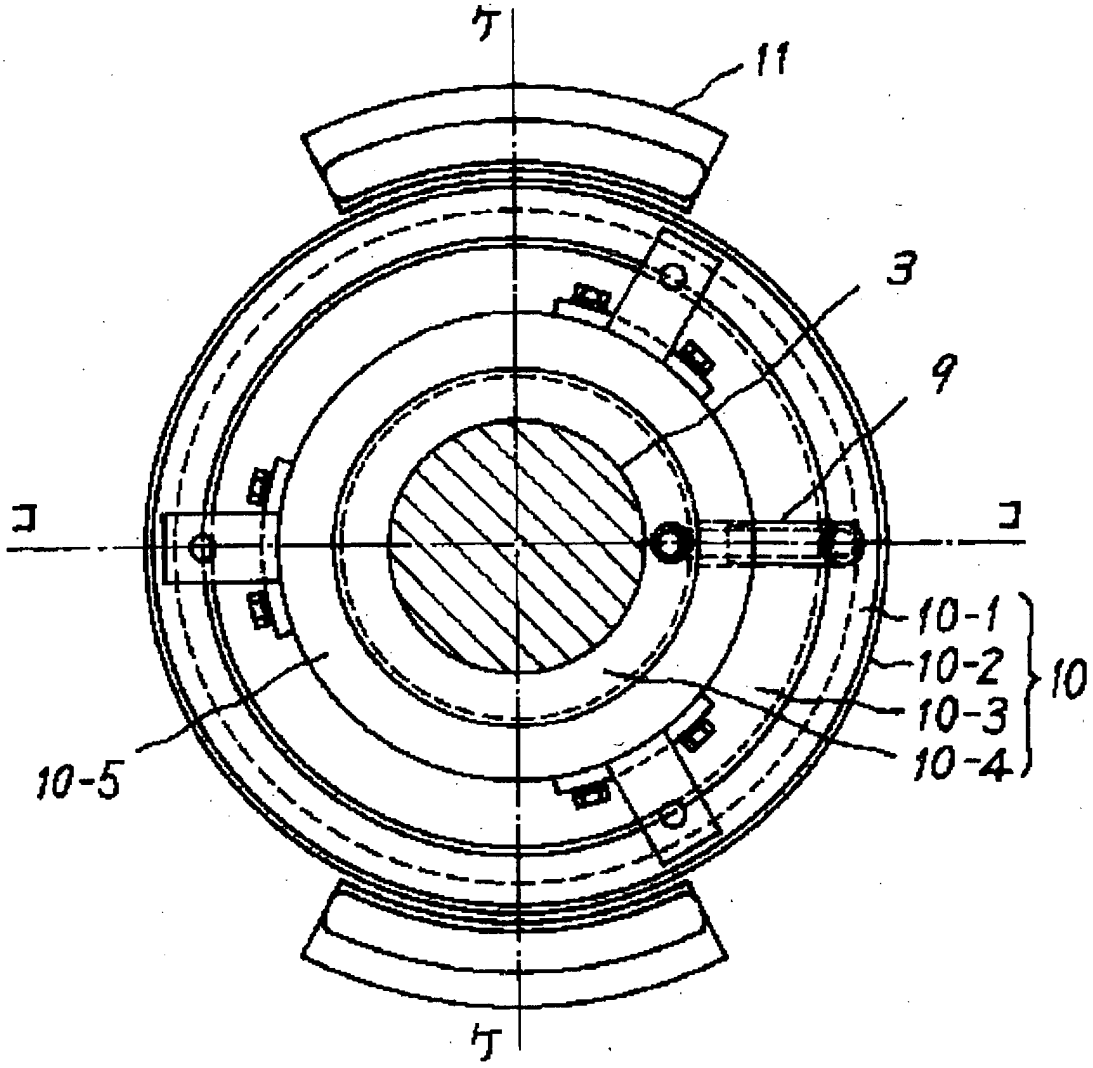
[Drawing 11]



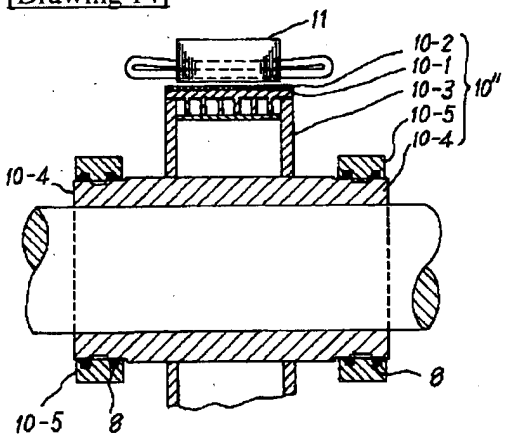
[Drawing 12]



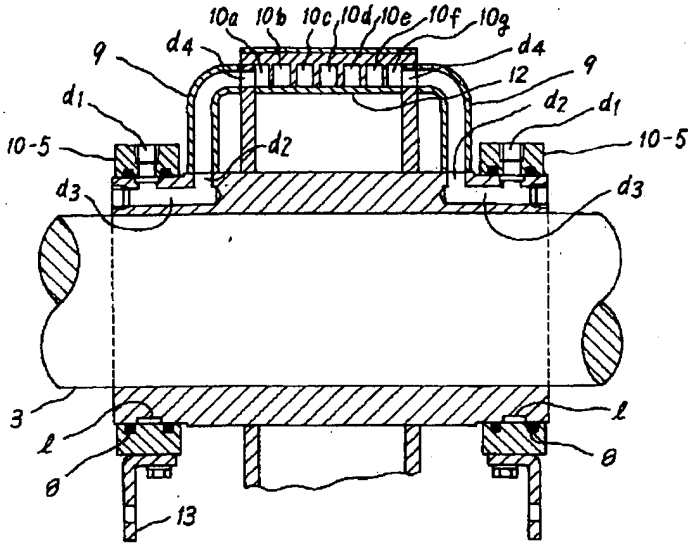
[Drawing 13]



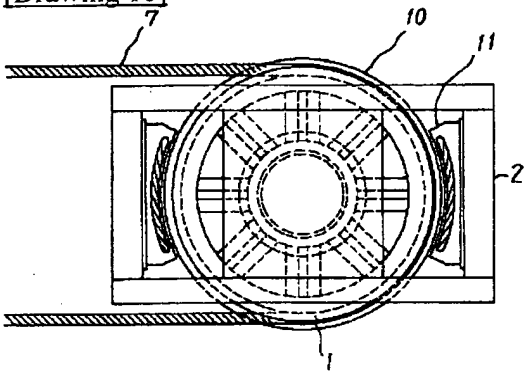
[Drawing 14]



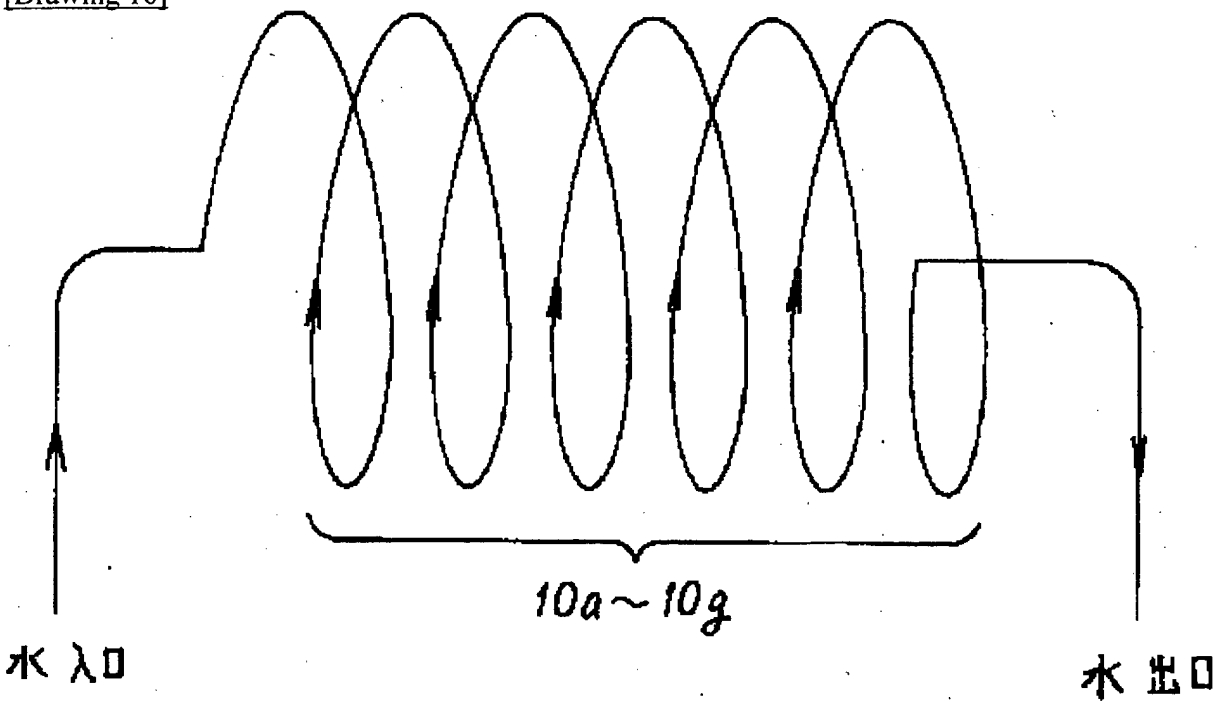
[Drawing 15]



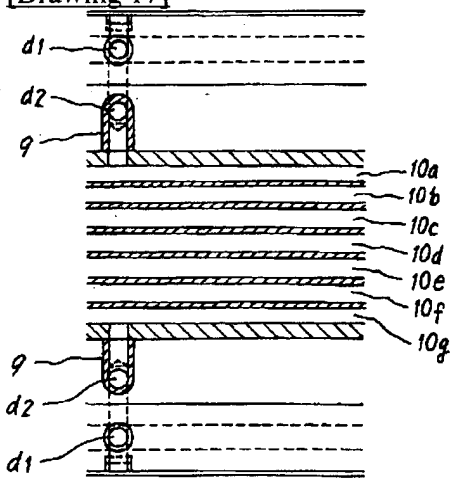
[Drawing 18]



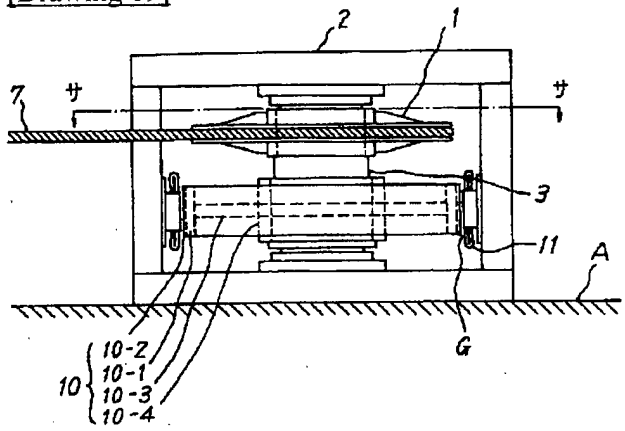
[Drawing 16]



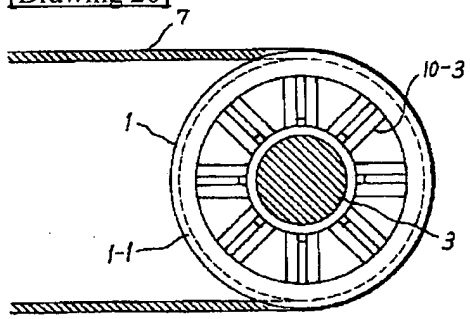
[Drawing 17]



[Drawing 19]



[Drawing 20]



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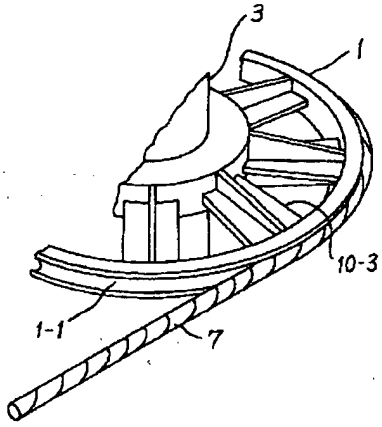
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10-3
1-1
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	Z			
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F28F 5/02		9141－3L		

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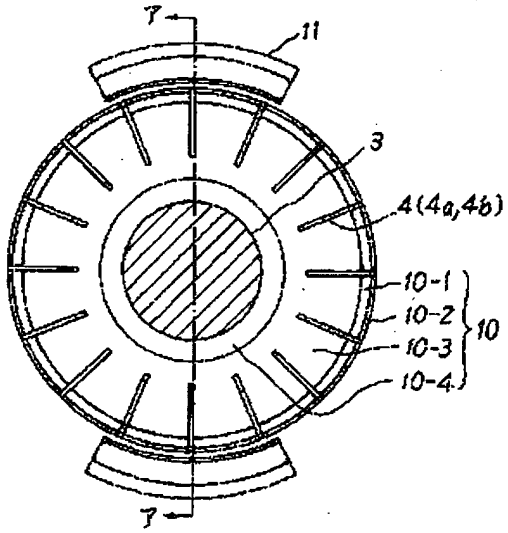
(54)【発明の名称】　索道用駆動装置の冷却構造

(57)【要約】

【目的】　リフトやゴンドラ等の索道装置において、ワイヤーロープの駆動をリニアモータにより行う場合に問題になる、二次側の駆動ドラムの過熱を、駆動ドラムを大きくすることなく防止しようとするものである。

【構成】　磁性体にて作られた円筒状ドラムと、導電体で作られたプレートと、リブ及び該リブの両側に有するボスから成る駆動ドラムに対して、円筒状ドラムの内側に、冷却フィンを内側に向かって固着した構成のフィン冷却構造を有するか、または、前記駆動ドラムの両側ボスの外周に固定体に取り付けられた円環をそれぞれ嵌着し、前記円筒状ドラムの内面に設けた冷却溝へ前記両円環から冷却水を注入及び排出するよう構成したことを特徴とする。



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【特許請求の範囲】

【請求項１】２点間を移送する区間の両端にそれぞれワイヤーロープ用滑車を設け．これらのワイヤーロープ用滑車間にエンドレスのワイヤーロープを張設し．少なくとも前記ワイヤーロープ用滑車のうちの一方を駆動源にて回転させて．ワイヤーロープに保持された移送体を移送する索道装置の駆動側のワイヤーロープ用滑車と同一軸上に磁性体にて作られた円筒状のドラムを設け．該ドラムの外周面に導電体を貼着あるいは螺着し、該導電体と一定の間隔を設けてリニアモータの鉄心を円弧状に構成してなる円弧状リニアモータを設置し、該円弧状リニアモータと前記ドラム及び導電体によって発生するトルクをワイヤーロープ用滑車に伝達する索道用駆動装置において、

前記磁性体にて作られた円筒状ドラム等より構成された駆動ドラムに．該ドラムを冷却せしめるフィン冷却構造を具備したことを特徴とする索道用駆動装置の冷却構造。

【請求項２】前記フィン冷却構造を．前記磁性体にて作られた円筒状ドラムの内側に、複数の板状の冷却フィンを内側に向かって固着して構成したことを特徴とする請求項１記載の索道用駆動装置の冷却構造。

【請求項３】前記フィン冷却構造を．前記磁性体にて作られた円筒状ドラムの内側に、複数の板状の冷却フィンを内側に向かって固着し．更に前記冷却フィンの軸方向両端に円板状の板を固着して構成したことを特徴とする請求項１記載の索道用駆動装置の冷却構造。

【請求項４】前記フィン冷却構造を．前記磁性体にて作られた円筒状ドラムの内側に、複数の板状の冷却フィンを内側に向かって固着し．更に前記冷却フィンの軸方向両端に円板状の板を固着するとともに．前記冷却フィン間に冷却風を分割する分割板を冷却フィンの軸芯側に固着したことを特徴とする請求項１記載の索道用駆動装置の冷却構造。

【請求項５】２点間を移送する区間の両端にそれぞれワイヤーロープ用滑車を設け．これらのワイヤーロープ用滑車間にエンドレスのワイヤーロープを張設し．少なくとも前記ワイヤーロープ用滑車のうちの一方を駆動源にて回転させて．ワイヤーロープに保持された移送体を移送する索道装置の駆動側のワイヤーロープ用滑車と同一軸上に磁性体にて作られた円筒状のドラムを設け．該ドラムの外周面に導電体を貼着あるいは螺着し、該導電体と一定の間隔を設けてリニアモータの鉄心を円弧状に構成してなる円弧状リニアモータを設置し、該円弧状リニアモータと前記ドラム及び導電体によって発生するトルクをワイヤーロープ用滑車に伝達する索道用駆動装置において、

前記磁性体にて作られた円筒状ドラムと、導電体で作られたプレートと．リブ及び該リブの両側に有するボスから成る駆動ドラムの各ボス部の外周に．固定体に取り付けられた円環をそれぞれ嵌着し、前記円筒状ドラムの内面に設けた冷却溝へ前記両円環から冷却水を注入及び排出するように構成したことを特徴とする索道用駆動装置の冷却構造。

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【請求項６】前記円筒状ドラムの内面に設けた冷却溝を迷路状に構成したことを特徴とする請求項５記載の索道用駆動装置の冷却構造。

【請求項７】前記円筒状ドラムの内面に設けた冷却溝を螺旋状に構成したことを特徴とする請求項５記載の索道用駆動装置の冷却構造。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、リフトやゴンドラなどの索道装置において使用する、索道用駆動装置の冷却構造に関するものである。

【０００２】

【従来の技術】リフトやゴンドラなどの索道装置は、移送する区間の両端にワイヤーロープ用滑車を設け．該滑車間にエンドレスのワイヤーロープを張設し、更に移送区間の途中では変曲点用あるいはワイヤーロープの弛み防止のために．支柱に取り付けられたガイド用滑車を設けている。そして、リフトやゴンドラなどを該ワイヤーロープに保持させ、移送区間の両端にあるワイヤーロープ用滑車の少なくとも一方に、回転駆動するための駆動装置を取り付けて、リフトやゴンドラなどの移送を行う装置である。

【０００３】図18及び図19に、従来の索道装置に使用されている、リニアモータによって構成された索道用駆動装置の一例を示す。図18は平面図であり、図19は側面図である。

【０００４】ワイヤーロープ用滑車１と駆動ドラム10とを軸３に固着し．軸３はこれらワイヤーロープ用滑車１と駆動ドラム10とが水平になるようにフレーム２に回転可能に取り付けられている。駆動ドラム10は、ボス10-4と磁性体でできている円筒状ドラム10-1とをリブ10-3により同心的に連結し、この円筒状ドラム10-1の外周面に銅又はアルミニウム等の導電体で作られたプレート10-2を貼着又は螺着して構成されている。

【０００５】ワイヤーロープ７は平面図20及び斜視図21に示すごとく．ワイヤーロープ用滑車１の外周に設けられた溝1-1 に張設されている。一方．図22の斜視図に示すごとく、鉄心11-3の磁束作用面を円弧状に構成し、該鉄心11-3にコイル11-2を巻装したものを取付枠11-1に取り付けてなる円弧状リニアモータ11を．駆動ドラム10の外周と所定の空隙Ｇをあけて配置してある。なお．図22の斜視図においては、コイル巻装用の溝を省略して示してある。このように構成した索道用駆動装置は基礎Ａに固定されている。

【０００６】かような構成において．円筒状リニアモータ11が付勢されると、リニアモータ11に三相交流を供給

して発生した移動磁界が駆動ドラム10に回転力を生じさせ、ワイヤーロープ用滑車1が20rpm 程度の速度で回転する。この時、駆動ドラム10には渦電流が発生し、これはジュール熱となって駆動ドラム10を加熱する。この時冷却を行わない場合には 150℃以上に上昇する。

【０００７】

【発明が解決しようとする課題】従来のこの種の乗道用駆動装置の駆動ドラムには、冷却装置は設けられておらず、単に円筒状ドラムの表面から若干の冷却効果を上げているに過ぎなかった。そのため、過大な温度上昇により種々の部分に損傷を招くことになる。もちろん負荷によっても異なるが、少なくともこの温度上昇を 150℃近傍に抑えることが望ましい。そのために、外部にファン等を設けて強制通風を行う手段も考えられるが、駆動ドラムの直径はかなり大きいものであり、小容量のファンでは効果が薄く、大容量のファンを据え付けなければならない。強制通風を行わずに自然冷却のみによる方法もあるが、その場合には円筒状ドラムの直径をさらに大幅に大きくしてその表面を増大し、冷却効果を上げなくてはならない。

【０００８】本発明は上記の点に鑑みなされたもので、別置きファンを設けることなく、且つ円筒状ドラムの直径を大きくすることもなしに、乗道用駆動装置の駆動ドラムの温度を 150℃近傍以下に抑えることができる、乗道用駆動装置の冷却構造を提供することを目的としている。

【０００９】

【課題を解決するための手段】前記の目的を達成するために、本発明による乗道駆動装置の冷却構造は、２点間を移送する区間の両端にそれぞれワイヤーロープ用滑車を設け、これらのワイヤーロープ用滑車間にエンドレスのワイヤーロープを張設し、少なくとも前記ワイヤーロープ用滑車のうちの一方を駆動源にて回転させて、ワイヤーロープに保持された移送体を移送する乗道装置の駆動側のワイヤーロープ用滑車と同一軸上に磁性体にて作られた円筒状のドラムを設け、該ドラムの外周面に導電体を貼着あるいは螺着し、該導電体と一定の間隔を設けてリニアモータの鉄心を円弧状に構成してなる円弧状リニアモータを設置し、該円弧状リニアモータと前記ドラム及び導電体によって発生するトルクをワイヤーロープ用滑車に伝達する乗道用駆動装置において、前記磁性体にて作られた円筒状ドラム等より構成された駆動ドラムに、該ドラムを冷却せしめるフィン冷却構造を具備したことを特徴としている。

【００１０】前記のフィン冷却構造を、前記磁性体にて作られた円筒状ドラムの内側に、複数の板状の冷却フィンを内側に向かって固着して構成したことを特徴としてもよい。

【００１１】また、前記のフィン冷却構造を、前記磁性体にて作られた円筒状ドラムの内側に、複数の板状の冷却フィンを内側に向かって固着し、更に前記冷却フィンの軸方向両端に円板状の板を固着して構成したことを特徴としてもよい。

【００１２】更に、前記のフィン冷却構造を、前記磁性体にて作られた円筒状ドラムの内側に、複数の板状の冷却フィンを内側に向かって固着し、更に前記冷却フィンの軸方向両端に円板状の板を固着するとともに、前記冷却フィン間に冷却風を分割する分割板を冷却フィンの軸芯側に固着したことを特徴としてもよい。

【００１３】空冷では不十分な場合には、冷却水を使用する水冷により、前記磁性体にて作られた円筒状ドラムと、導電体で作られたプレートと、リブ及び該リブの両側に有するボスから成る駆動ドラムの各ボス部の外周に、固定体に取り付けられた円環をそれぞれ嵌着し、前記円筒状ドラムの内面に設けた冷却溝へ前記両円環から冷却水を注入及び排出するように構成したことを特徴とする。

【００１４】前記円筒状ドラムの内面に設けた冷却溝を迷路状に構成したことを特徴としてもよい。

【００１５】また、前記円筒状ドラムの内面に設けた冷却溝を螺旋状に構成したことを特徴としてもよい。

【００１６】

【作用】本発明による乗道用駆動装置の冷却構造の作用を以下に述べる実施例と併せて説明することとし、請求項別に図面に基づいて詳述する。

【００１７】

【実施例】図１及び図２は、請求項１及び２に関する本発明の乗道用駆動装置の冷却構造の一実施例を示す図であって、図１は平面図、図２は図１のア～ア矢視断面図であって、図中、図13～22と同一符号は同一又は同一機能を有する部分を示している。図１及び図２に示すごとく板状の小片4a、4bから成る冷却フィン４が、リブ10-3の両側で、且つ円筒状ドラム10-1の内側に向かって固着されている。

【００１８】なお、本実施例では冷却フィン４が板状の２枚の小片4a、4bで構成され、円筒ドラム10-1の軸芯に向かって内側に固定されているが、これに限られるものではなく、小片に分割せずに且つ軸芯に向かわずに傾斜して固定してもよい。フィンの形状も本例のようなほぼ矩形に限られるものではなく、適宜の形状であってもよい。

【００１９】このように構成されたフィンによる冷却構造を有する駆動ドラムにおいて、円弧状リニアモータ11が付勢されると駆動ドラム10に渦電流が流れ、ジュール熱が発生して駆動ドラム10の温度が上昇する。一方この駆動ドラムは回転し、冷却フィン４の遠心力により冷却風が発生し、冷却フィン４を冷却する。かくして、冷却フィン４が無い場合に比べて格段に増大した放熱表面積の効果のみならず、この発生した冷却風の効果により、駆動ドラム10の温度上昇を極度に抑えることができる。

【００２０】図３～５は、請求項１及び３に関する本発明の索道用駆動装置の冷却構造の一実施例を示す図であって、図３は平面図、図４は図３のイ～イ矢視断面図、図５は図４のウ～ウ矢視図である。図３～５に示したこの実施例の図１、２に示した実施例と異なる点は、冷却フィン４の両端に円環状の板５が固着されている点である。

【００２１】この円環状の板５と第３との間から冷却風Ｗが入り、矢印に沿って外側へ吹き抜けて、駆動ドラム10を冷却すると同時に円弧状リニアモータ11のコイルエンド部をも効率的に冷却する。このように、円環状の板５によって冷却風が分散することなく駆動ドラム10の外周へ放出されるので、放熱の効果を一層向上することができる。

【００２２】図６～８は、請求項１及び４に関する本発明の索道用駆動装置の冷却構造の一実施例を示す図であって、図６は平面図、図７は図６のエ～エ矢視断面図、図８は図７のオ～オ矢視図である。図６～８に示したこの実施例の図３～５に示した実施例と異なる点は、冷却フィンの間の冷却風通過部分に、この冷却風を分割する分割板を固着したことである。

【００２３】すなわち、本実施例においては先の実施例の図５に示した冷却フィン小片4aと4aとの間、及び4bと4bとの間に分割板６を固着してある。この分割板６は図７に示したように傾斜させて取り付け、駆動ドラム10へ吸い込まれる全部の冷却風Ｗを冷却風ｗとｗ′とに分割し、リブ10-3側の冷却風ｗを円筒状ドラム10-1へ強く当てた後、残りの冷却風ｗ′と合流して円弧状リニアモータ11のコイルエンド部に到達するように構成してある。かくして、駆動ドラム10の冷却効率を一層向上することができる。

【００２４】図９～12は、請求項５及び６に関する本発明の索道用駆動装置の冷却構造の冷却水を利用した一実施例を示す図であって、図９は平面図、図10は図９のカ～カ線断面図、図11は図９のキ～キ線における要部断面図であり、図12は図11の円筒状ドラムの溝を平面に展開して示した展開図である。

【００２５】冷却水の通路は、固定体（図示せず）に固定金具13により取り付けられる２組の円環10-5と、円筒状ドラム10-1、導電体で作られたプレート10-2、リブ10-3及びリブの両側に有するボス10-4から成る駆動ドラム10′と、シールリング８と、２組の連通管９と、から構成されている。２組の円環10-5は図11に示すごとく径方向に貫通孔d1を有し、リブ10-3の両側ボス10-4の外周部にシールリング８を介して嵌着されている。ボス10-4の外周には、２個の円環10-5にそれぞれ設けられた貫通孔d1と連通する環状の溝ｉが形成されており、これらの溝ｉはそれぞれ２個のシールリング８により気密を保たれている。円筒状ドラム10-1の内側には、リブ10-3の両側にそれぞれ２箇所の溝10a，10b及び10c，10dが設けられており、それらの溝10a，10b及び10c，10dは円筒体蓋12によって密閉構造を形成すると共に、各溝間は図12に示すごとく迷路状に連通し、リブ10-3の両側の溝10b と10cとを連通させるためにリブ10-3には連通孔d4が設けられている。両端部の溝10aと10d とはそれぞれ、ボス10-4に設けられた連通孔d3，d2と連通管９とにより、ボス10-4の両側の外周に設けられた溝１へ気密に連通されている。シールリング８は回転体であるボス10-4に設けられた溝ｉと固定部である円環10-5に設けられた貫通孔d1との間に気密を保ち、冷却水が漏れないように設けられているものである。

【００２６】冷却水が固定された一方の円環10-5の貫通孔d1から注入され、連通孔d3，d2及び連通管９を通って円筒状ドラム10-1に設けられた迷路状溝10a，10b，10c，10dを通過して円筒状ドラム10-1を冷却し、他方の連通管９及び連通孔d2，d3を通って、他方の固定された円環10-5の貫通孔d1から排出される。このようにして駆動ドラム10′に発生するジュール熱を強力に冷却することができる。

【００２７】なお、本実施例ではリブ10-3の両側の円筒ドラム10-1にそれぞれ２箇所の溝を設けたが、これに限定されるものではなく、適宜の溝数とすることができる。

【００２８】一般に駆動ドラム10の温度上昇はプレート10-2部分が最も著しく、この部分の冷却を主体とする必要がある。しかし、プレート10-2に空間を設けて冷却水を流通させることは、リニアモータの空隙を増すことになって推力の低下が起こる。そこで、この部分を貼着している円筒ドラム10-1に連続的に冷却水を注入するために、図11に示した固定金具13により外部の固体に円環10-5を固定し、この円環10-5を介して大量の冷却水を連続的に円筒ドラム10-1部分に供給するようにしたものである。冷却水の経路を再度詳細に説明すると、例えばリブ10-3の左側の円環10-5の貫通孔d1から冷却水を注入した場合、この貫通孔d1の直下に存在する溝ｉ、連通孔d3とd2、連通管９を経て、溝10a，10b、リブ10-3の連通孔d4を通った後、溝10c，10dを流れてジュール熱による駆動ドラム10-1の熱を吸収し、他方の連通管９、連通孔d2とd3、溝ｉを経て、右側の円環10-5の貫通孔d1から排出される。なお、円環10-5の冷却水の入口及び出口の水漏れには充分な考慮が払われており、この実施例ではパッキン等でシーリングされている。

【００２９】図13～17は、請求項５及び７に関する本発明の索道用駆動装置の冷却構造の冷却水を利用した一実施例を示す図であって、図13は平面図、図14は図13のケ～ケ線における断面図、図15は図13のコ～コ線における要部断面図、図16は円筒状ドラムに設けた溝の構成図であり、図17は図15の円筒状ドラムの溝を平面に展開した展開図である。これらの各図面において図９～12と同一の符号は同一又は同一機能を有する部分を示している。

【００３０】冷却水の通路は、固定体（図示せず）に固定金具13により取り付けられる２組の円環10-5と、円筒状ドラム10-1、導電体で作られたプレート10-2、本例では２個のリブ10-3（円筒状ドラム10-1の両端部に設けられている）及びリブの両側に有するボス10-4から成る駆動ドラム10'と、シールリング８と、２組の連通管９と、から構成されている。２組の円環10-5は図15に示すごとく径方向に貫通孔d1を有し、両側のリブ10-3の外側のボス10-4の外周部にシールリング８を介して配設されている。ボス10-4の外周には、２個の円環10-5にそれぞれ設けられた貫通孔d1と連通する環状の溝ｉが形成されており、これらの溝ｉはそれぞれ２個のシールリング８により気密を保たれている。リブ10-3間の円筒状ドラム10-1の内側には螺旋状の溝10a ～10q が設けられており、それらの溝10a ～10q は円筒体蓋12によって密閉構造を形成すると共に、両側のリブ10-3には螺旋溝の両端部である一方の溝10a 及び他方の溝10q をそれぞれ連通管９へ連通するために連通孔d4が設けられている。これらの連通管９をそれぞれボス10-4の外周の環状の溝ｉへ連通させるために、ボス10-4に連通孔d3，d2が設けられている。シールリング８は回転体であるボス10-4に設けられた溝ｉと固定部である円環10-5に設けられた貫通孔d1との間に気密を保ち、冷却水が漏れないように設けられているものである。

【００３１】冷却水が固定された一方の円環10-5の貫通孔d1から注入され、連通孔d3，d2及び連通管９を通って円筒状ドラム10-1に設けられた螺旋溝10a ～10q を通過して円筒状ドラム10-1を冷却し、他方の連通管９及び連通孔d2，d3を通って、他方の円環10-5の貫通孔d1から排出される。このようにして、駆動ドラム10'に発生するジュール熱を強力に冷却することができる。

【００３２】螺旋溝10a ～10q は図16に示したように螺旋状に形成されており、円筒ドラム10-1の内面に螺旋状のねじ溝を形成した後、このねじ山部分に当接する外周径を有する円筒体蓋12を嵌着せしめて、外部に水が漏れないように密封構造としている。本実施例では２個のリブ10-3の内側の円筒ドラム10-1の内面に７回りの螺旋溝を設けたが、これに限定されるものではなく、適宜の旋回数とすることができる。

【００３３】冷却水の経路を再度詳細に説明すると、例えば左側の円環10-5の貫通孔d1から冷却水を注入した場合、この貫通孔d1の直下に存在する溝１、連通孔d3とd2、連通管９及び連通孔d4を経て、螺旋溝10a ～10q を流れてジュール熱による駆動ドラム10-1の熱を吸収し、他方の連通孔d4及び連通管９、連通孔d2とd3、溝１を経て、右側の円環10-5の貫通孔d1から排出される。なお、円環10-5の冷却水の入口及び出口の水漏れには充分な考慮が払われて、この実施例ではパッキン等でシーリングされている。

【００３４】

【発明の効果】以上、実施例により詳細に説明したごとく、本発明によれば負荷の容量に合わせて各種の構造を適用することにより、駆動ドラムの温度を 150℃以内に抑えることが可能となる。別に強制通風用のファンを設けることなく、簡単にこの目的を達成できるものが多いが、特に発生ジュール熱の大きい場合には冷却水により駆動ドラムを冷却することにより、目的を達成することができる。いずれの方法を取るにしてもドラム直径を極端に大きくする必要がなくなるので、本発明による索道用駆動装置の冷却構造は実用上極めて有用性が高いものである。

【図面の簡単な説明】

【図１】請求項１及び２に関する本発明の索道用駆動装置の冷却構造の一実施例を示す平面図である。

【図２】図１のア～ア矢視断面図である。

【図３】請求項１及び３に関する本発明の索道用駆動装置の冷却構造の一実施例を示す平面図である。

【図４】図３のイ～イ矢視断面図である。

【図５】図４のウ～ウ矢視図である。

【図６】請求項１及び４に関する本発明の索道用駆動装置の冷却構造の一実施例を示す平面図である。

【図７】図６のエ～エ矢視断面図である。

【図８】図７のオ～オ矢視図である。

【図９】請求項５及び６に関する本発明の索道用駆動装置の冷却構造の冷却水を利用した一実施例を示す平面図である。

【図１０】図９のカ～カ線断面図である。

【図１１】図９のキ～キ線における要部断面図である。

【図１２】図11の円筒状ドラムの溝を平面に展開して示した展開図である。

【図１３】請求項５及び７に関する本発明の索道用駆動装置の冷却構造の冷却水を利用した一実施例を示す平面図である。

【図１４】図13のコ～コ線における断面図である。

【図１５】図13のケ～ケ線における要部断面図である。

【図１６】円筒状ドラムに設けた溝の構成図である。

【図１７】図15の円筒状ドラムの溝を平面に展開した展開図である。

【図１８】従来の索道装置に使用されている、リニアモータによって構成された索道用駆動装置の一例を示す平面図である。

【図１９】従来の索道装置に使用されている、リニアモータによって構成された索道用駆動装置の一例を示す側面図である。

【図２０】ワイヤーロープの張設状況を示す平面図である。

【図２１】ワイヤーロープの張設状況を示す斜視図である。

【図２２】本発明に使用する積層の円弧状リニアモータの斜視図である。

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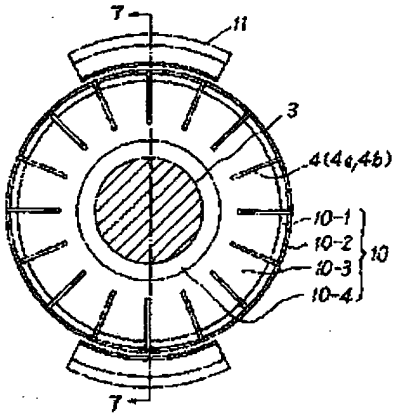
【符号の説明】

1 ワイヤーロープ用滑車
1-1 外周に設けられた溝
2 フレーム
3 軸
4 冷却フィン
4a, 4b 冷却フィンの小片
5 円環状の板
6 分割板
7 ワイヤーロープ
8 シールリング
9 追通管
10, 10′, 10″ 駆動ドラム
10-1 磁性体でできている円筒状ドラム
10-2 銅又はアルミニウム等の導電体で作られたプレート
10-3 リブ
＊10-4 ボス
10-5 円環
10a ～10q 円筒状ドラムの内面に設けられた溝
11 円弧状リニアモータ
11-1 取付枠
11-2 コイル
11-3 鉄心
12 円筒体蓋
13 固定金具
A 基礎
G 空隙
d1 貫通孔
d2, d3, d4 追通孔
I ボス外周の溝
W 冷却風
w, w′ 分割された冷却風

＊

【図1】



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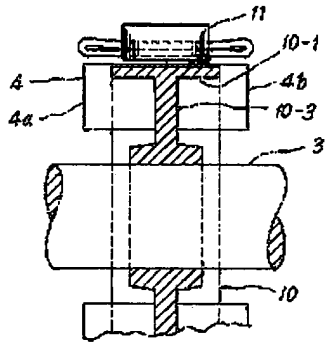

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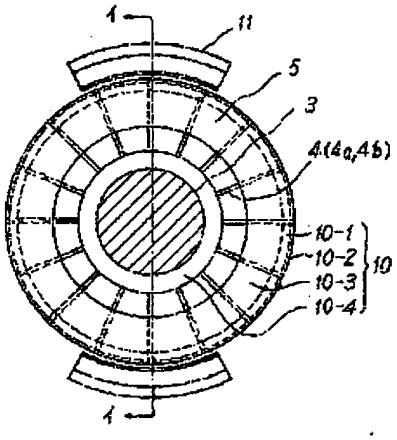

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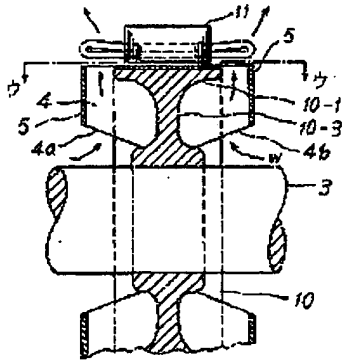

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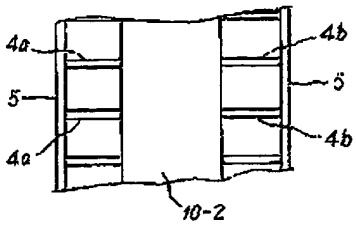

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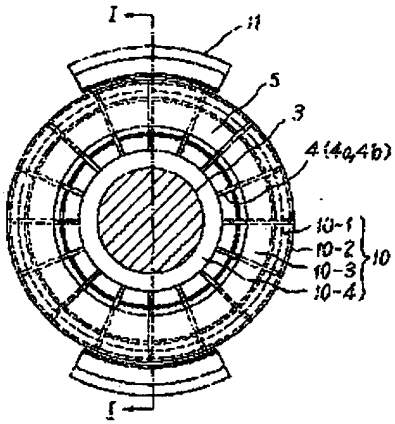

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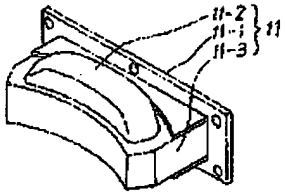

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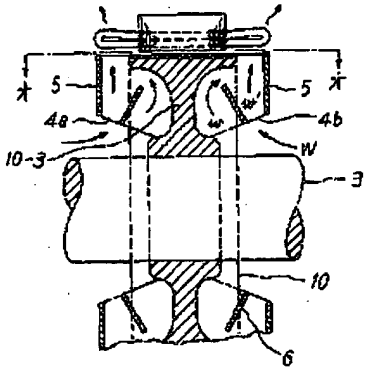

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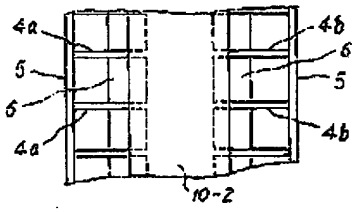

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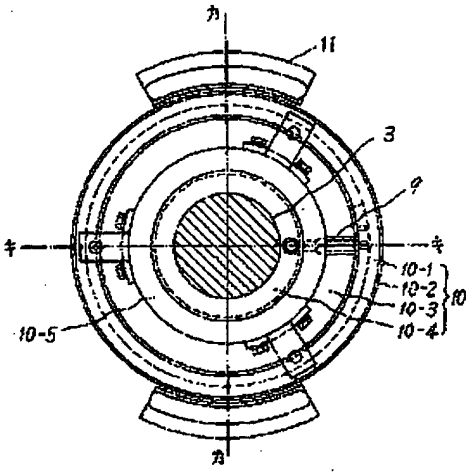

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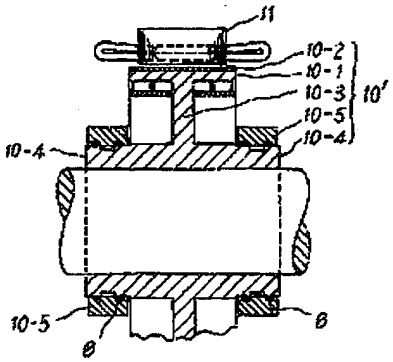
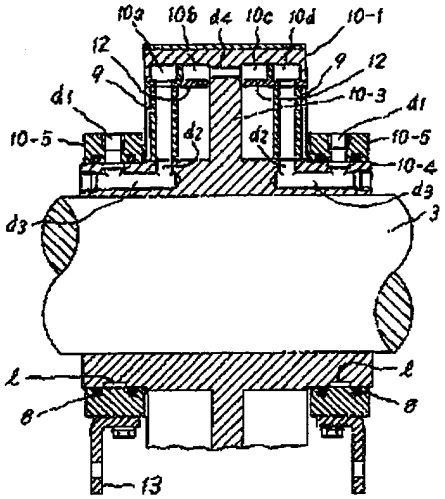
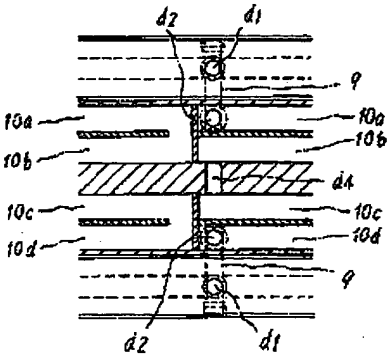


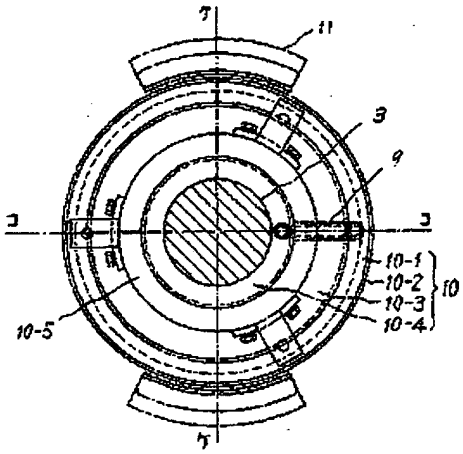
【図１１】



【図１２】



【図１３】



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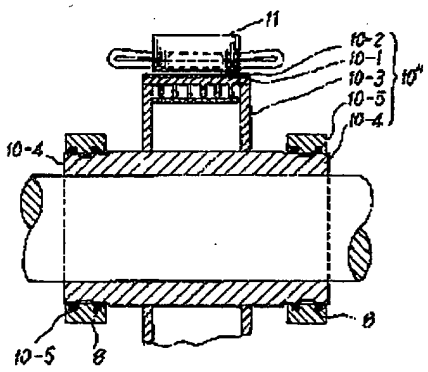

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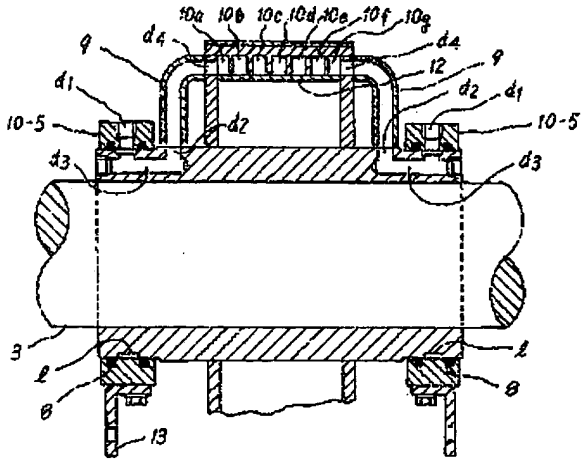

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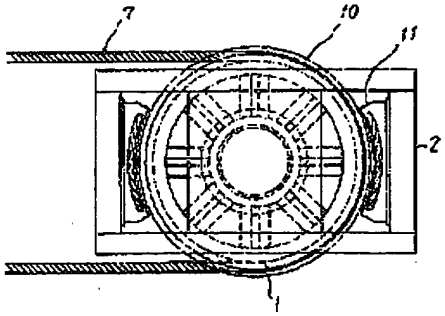

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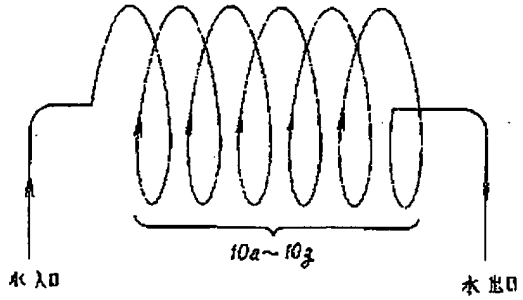
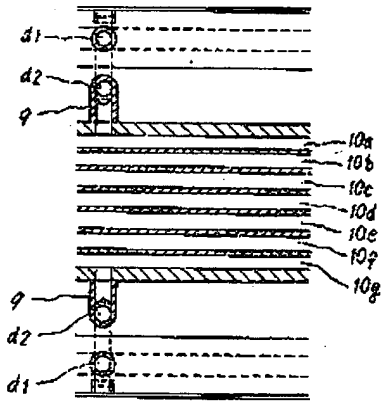


【図17】



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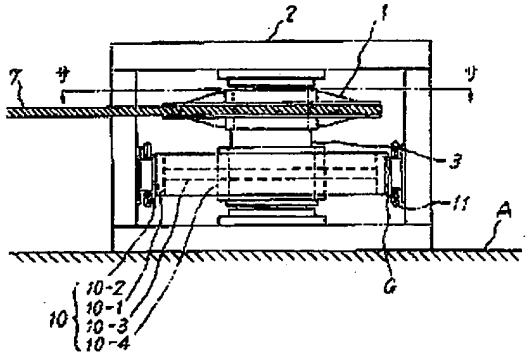

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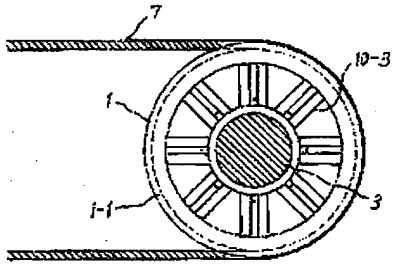

【図21】